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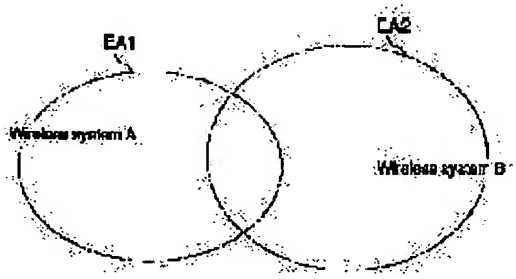
(71)Applicant : TOSHIBA CORP

(72)Inventor : OTAKA SHOJI

(54) METHOD FOR CONTROLLING TRANSMISSION RATE OF SOFTWARE RADIO EQUIPMENT

(57)Abstract:

PROBLEM TO BE SOLVED: To permit a subscriber to execute communication without a strange feeling at the time of hand-over between different radio systems by assigning a transmission rate to permit a difference to be small between a transmission rate to be required for transmission/reception at the time of changing-over the radio systems and the transmission rate to be assigned in the radio system to be shifted.



SOLUTION: It is recognized that a picture signal is exchanged in the first radio system A and picture information is transmitted the side of a software radio equipment in the case of the shift from the service area EA1 of the system A to the area EA2 of the second radio system B. When the software radio equipment is moved from the first system to the area EA2 of the system B, control is executed so as to permit the transmission rate of the system B to be the max. one at the time of hand-over between the different kinds of radio systems. When transmission information is picture information, the deterioration of picture quality is prevented by increasing the compression rate.

LEGAL STATUS

[Date of request for examination]

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[Kind of final disposal of application other than the examiner's decision of rejection or application converted registration]

[Date of final disposal for application]

[Patent number]

[Date of registration]

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[Date of requesting appeal against examiner's decision of rejection]

[Date of extinction of right]

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CLAIMS

[Claim(s)]
[Claim 1] In the walkie-talkie whose communication link was adapted for two or more sorts of wireless systems, and was enabled with software So that the difference of the transmission rate required of transmission and reception and the transmission rate which can be assigned by the shifting wireless system may be made small, in case a wireless system is changed and it shifts at the time of migration in the service area of a different-species wireless system, without intercepting The transmission rate control approach of the software walkie-talkie characterized by assigning a transmission rate and performing a communication link at the assigned transmission rate.
[Claim 2] The transmission rate control approach of the software walkie-talkie according to claim 1 characterized by controlling a transmission rate by the size of the transmission rate A required of a communication link, and the maximum transmission rate B of the wireless system after a change.
[Claim 3] It is the transmission rate control approach of the software walkie-talkie according to claim 2 which said transmission rate A makes a transmission rate the transmission rate B when larger than said transmission rate B, and is characterized by assigning a transmission rate to the transmission rate nearest to the transmission rate which is more than the transmission rate A and was moreover assigned to the wireless system after a change when said transmission rate A is said below transmission rate B.
[Claim 4] The transmission rate control approach of the software walkie-talkie according to claim 3 characterized by raising the maximum transmission rate by assigning two or more slots when the wireless system after a change is TDD/TDMA.
[Claim 5] In the walkie-talkie whose communication link was adapted for two or more sorts of wireless systems, and was enabled with software So that the difference of the transmission rate required of transmission and reception and the transmission rate which can be assigned by the shifting wireless system may be made small, in case a wireless system is changed and it shifts at the time of migration in the service area of a different-species wireless system, without intercepting The transmission rate control approach of the software walkie-talkie characterized by making it display on a display means the wireless system name and average transmission rate value by which current connection is made while assigning a transmission rate and being made to perform a communication link at the assigned transmission rate.

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TECHNICAL FIELD

[Field of the Invention] This invention is concerned with transmission rate control of the walkie-talkie which was adapted for two or more wireless systems, and in case a wireless system is changed and it shifts especially at the time of migration in the service area of a different-species wireless system, without intercepting, it relates to the transmission rate control approach of the software walkie-talkie it enabled it to change to a required transmission rate efficiently.

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PRIOR ART

[Description of the Prior Art] In recent years, the subscriber of the mobile radio machine represented by PHS (personal handy phone system) and PDC (pocket mold data terminal) is increasing, and development of a wireless terminal is briskly performed in connection with this.
[0003] By the way, generally these wireless terminals are adapted to a certain specific wireless system. Therefore, it is impossible to use by the wireless system from which others differ only by the wireless system of specification [a specific wireless terminal] although it is usable.
[0004] However, development of the dual mode terminal which the high wireless terminal of the versatility which connects with the wireless system by which plurality differs in recent years, and can be used was required, came, and was adapted for two different wireless systems has prospered.
[0005] However, even if it uses a dual mode terminal, it is connectable with no wireless systems. And in the wireless system from which one of the big reasons which are not connectable with a different wireless system differs, it is mentioned that a transmission rate differs from a strange recovery etc.
[0006] The software walkie-talkie technique all wireless systems and connection were enabled theoretically is proposed in such a situation by adopting the configuration which processes the strange recovery by the software with which the walkie-talkie was equipped etc. [whose]
[0007] Although a highly precise thing is required of analog circuits, such as the RF (high frequency) section, and hardware, such as an analog-to-digital converter, it can connect with a desired wireless system by rewriting the software with which a software walkie-talkie is equipped at such a software walkie-talkie.
[0008] Moreover, even if beginning of mission of the wireless system new after a user's purchasing the software wireless terminal concerned is built and carried out in this case, a software walkie-talkie is rewriting software and has the features that that new wireless system can be used.
[0009] If this software walkie-talkie is used, what a wireless system is changed for (this is hereafter called wireless system hand-over) will become possible technically, without intercepting a message.
[0010] the service areas 51-53 of the finite which the base station of CDMA, PHS, and PDC which are an unrelated system different, respectively as this shows drawing 5 is installed in an area different, respectively, and overlaps in part in those areas -- with, when [which it moved between these wireless systems, and continued the communication link] are applied, and carrying out for being, it has the advantage that it can talk over the telephone, without intercepting. However, since a transmission rate changes with each wireless systems, transmission rate control is needed.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] A software walkie-talkie can be connected now with a desired wireless system by rewriting the software equipped. If this software walkie-talkie is used, it will become possible technically to change a wireless system, i.e., wireless system hand-over, without intercepting a message.
[0012] And it enables it for this to move between these wireless systems and to continue a communication link, when the unrelated system by which plurality differs is employed in the form which is a service area different, respectively and overlaps a service area in part.
[0013] However, since a transmission rate changes with each wireless systems, the thing of a transmission rate to do for change control is [as seeming / it / that it is convenient to a communication link] needed. Then, the place made into the purpose of this invention is to offer the transmission rate control approach of the software walkie-talkie which enabled it to carry out change control of the transmission rate so that a subscriber can communicate without sense of incongruity at the time of the hand-over between different wireless systems.

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MEANS

[Means for Solving the Problem] In order to attain the above-mentioned purpose, this invention is constituted as follows. That is, in case a wireless system is changed and it shifts at the time of migration in the service area of a different-species wireless system, without intercepting, make a transmission rate assign and it is made a communication link at the assigned transmission rate carrying out in the walkie-talkie whose communication link was adapted for two or more sorts of wireless systems, and enabled with software so that the difference of the transmission rate required of transmission and reception and the transmission rate which can be assigned by the shifting wireless system may make small.
[0015] In this invention, as a result of assigning the transmission rate of a walkie-talkie so that the difference of the transmission rate required of transmission and reception and the transmission rate which can be assigned by each system may be made small, the software walkie-talkie which can carry out now change control of the transmission rate so that a subscriber can communicate without sense of incongruity at the time of the handover between different wireless systems can be offered.
[0016]
[Embodiment of the Invention] Hereafter, the operation gestalt of this invention is explained with reference to a drawing. Besides the message channel, the software walkie-talkie of this invention shall hold original control channel S separately, and shall have considered it as the configuration which performs smoothly transmission rate change control in the time of the handover between different-species wireless systems by the control channel S concerned.
[0017] When the service area information on various kinds of wireless systems is held in control channel S and it comes to it near the edge of a service area, the preparations a message (communication link transmission) is ready are made to two or more of other wireless systems near [the] the service area. That is, it enables it for the software of two or more sorts of wireless systems to come to hand by ROM etc. and the radio transmission.
[0018] The transmission rate demanded changes with information delivered and received. For example, more generally [image information] than speech information, a high transmission rate is needed. The example of how to control a transmission rate to the service area 2EA2 HE **** case of the 2nd wireless system B from the service area EA1 of the 1st wireless system A shown in drawing 1 is described below. However, let the maximum transmission rate H of the 1st wireless system A be a high thing compared with the maximum transmission rate L of the 2nd wireless system.
[0019] The picture signal is transmitted and received and it is communicating at the transmission rate H in the 1st wireless system A. In this case, in a software walkie-talkie side, it has the function recognized to transmit image information, and recognizes as it being necessary to communicate above the transmission rate H.
[0020] However, a software walkie-talkie cannot transmit and receive at the transmission rate H, when the 2nd wireless system B carries out area EA2 HE migration from the 1st wireless system A. Therefore, it controls to make it the maximum transmission rate of the 2nd wireless system B at the time of the handover between different-species wireless systems.
[0021] In this case, it may be made to communicate by increasing the rate of picture compression by

lessening the amount of data with the fall of a transmission rate. Moreover, when the 2nd wireless system B is a system which performs a time sharing communication link like for example, a TDD/TDMA system, as shown in drawing 2 , two or more transmitting slots TX and receiving slots RX are assigned, and it may be made to make the maximum transmission rate high by this.

[0022] In addition, it is the slot to which the slash section was assigned among drawing 2 , and this example assigns two, TSr1 and TSr2, at a time as TSt1, TSt2, and an object for reception as an object for transmission.

[0023] Conversely, while transmitting the image, when it moves to the 1st wireless system A from the 2nd wireless system B, it controls similarly. Moreover, while transmitting speech information, when wireless system A HE migration is carried out from the wireless system B, the transmission rate in the wireless system A is assigned to the nearest transmission rate above the transmission rate L which was talking over the telephone by the wireless system B.

[0024] The above control procedure is packed into drawing 3 at the flow chart. A control procedure is explained along with the flow chart of drawing 3 . When performing the 2nd wireless system B HE and the handover between wireless systems from the 1st wireless system A, the transmission rate X demanded is compared with the transmission rate Y which can be transmitted by the 2nd wireless system B (steps S1, S2, and S3).

[0025] Consequently, if it is "X<Y", it will be larger than X among the transmission rates currently assigned by the wireless system B, and, moreover, will assign the transmission rate nearest to X (steps S8 and S7).

[0026] On the other hand, if the transmission rate Y is "X>Y" as a result of a comparison at step S3, it will consider as the maximum transmission rate Y of the 2nd wireless system B (S4). In addition, when the 2nd wireless system B is TDD/TDMA, two or more slots are assigned, and at this time, it may be made to enlarge the maximum transmission rate. Moreover, in X>Y, it is transmission information's judging whether it being image information, consequently raising compressibility, if it is image information, and it bars degradation of image quality etc.

[0027] Therefore, in step S4, if the maximum transmission rate is set to Y next, it judges whether it is image information (step S5), consequently if transmission information is not image information, it will go into the mode of a message, and will continue a communication link. Moreover, when it is the image upper part as a result of the judgment of step S5, a compressibility change is made so that compressibility may be raised (step S6), and it goes into the mode of a message, and a communication link is continued.

[0028] Although transmission rate control of the software walkie-talkie in the time of a handover is carried out by completing the above-mentioned procedure, an image may be suddenly confused with transmission rate modification. in this case, very worrisome in why it was confused, if it sees from a software walkie-talkie user's position -- it is. Therefore, while making it make a software walkie-talkie display the average value of the transmission rate which is carrying out current transmission on a display, it is good for it to make it make it indicate with what kind of wireless system it connects. This is shown in drawing 4 . In drawing 4 R> 4, 41 is a body of a software walkie-talkie, and 42 is a display by the liquid crystal panel. It is made to display the average information 43 on a transmission rate, and the classification information 44 on a wireless system current in use on this display 42.

[0029] As mentioned above, as explained in full detail, this invention is set to the walkie-talkie whose communication link was adapted for two or more sorts of wireless systems, and was enabled with software. So that the difference of the transmission rate required of transmission and reception and the transmission rate which can be assigned by the shifting wireless system may be made small, in case a wireless system is changed and it shifts at the time of migration in the service area of a different-species wireless system, without intercepting A transmission rate is assigned and it is made to perform a communication link at the assigned transmission rate. The result of having assigned the transmission rate of a walkie-talkie so that the difference of the transmission rate required of transmission and reception and the transmission rate which can be assigned by each system might be made small, Change control of the transmission rate can be carried out now so that a subscriber can communicate without

sense of incongruity at the time of the handover between different wireless systems.

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EFFECT OF THE INVENTION

[Effect of the Invention] As mentioned above, according to this invention, it sets to the walkie-talkie which can be equivalent to two or more sorts of wireless systems by which methods differ. By having been made to perform transmission rate control in order to assign the transmission rate of a walkie-talkie so that the difference of the transmission rate required of transmission and reception at the time of the handover between different-species wireless systems and the transmission rate which can be assigned by the shifting wireless system may be made small The rapid fall of a transmission rate can be prevented, and change control of the transmission rate can be carried out now so that a subscriber can communicate without sense of incongruity.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention is concerned with transmission rate control of the walkie-talkie which was adapted for two or more wireless systems, and in case a wireless system is changed and it shifts especially at the time of migration in the service area of a different-species wireless system, without intercepting, it relates to the transmission rate control approach of the software walkie-talkie it enabled it to change to a required transmission rate efficiently.
[0002]
[Description of the Prior Art] In recent years, the subscriber of the mobile radio machine represented by PHS (personal handy phone system) and PDC (pocket mold data terminal) is increasing, and development of a wireless terminal is briskly performed in connection with this.
[0003] By the way, generally these wireless terminals are adapted to a certain specific wireless system. Therefore, it is impossible to use by the wireless system from which others differ only by the wireless system of specification [a specific wireless terminal] although it is usable.
[0004] However, development of the dual mode terminal which the high wireless terminal of the versatility which connects with the wireless system by which plurality differs in recent years, and can be used was required, came, and was adapted for two different wireless systems has prospered.
[0005] However, even if it uses a dual mode terminal, it is connectable with no wireless systems. And in the wireless system from which one of the big reasons which are not connectable with a different wireless system differs, it is mentioned that a transmission rate differs from a strange recovery etc.
[0006] The software walkie-talkie technique all wireless systems and connection were enabled theoretically is proposed in such a situation by adopting the configuration which processes the strange recovery by the software with which the walkie-talkie was equipped etc. [whose]
[0007] Although a highly precise thing is required of analog circuits, such as the RF (high frequency) section, and hardware, such as an analog-to-digital converter, it can connect with a desired wireless system by rewriting the software with which a software walkie-talkie is equipped at such a software walkie-talkie.
[0008] Moreover, even if beginning of mission of the wireless system new after a user's purchasing the software wireless terminal concerned is built and carried out in this case, a software walkie-talkie is rewriting software and has the features that that new wireless system can be used.
[0009] If this software walkie-talkie is used, what a wireless system is changed for (this is hereafter called wireless system hand-over) will become possible technically, without intercepting a message.
[0010] the service areas 51-53 of the finite which the base station of CDMA, PHS, and PDC which are an unrelated system different, respectively as this shows drawing 5 is installed in an area different, respectively, and overlaps in part in those areas -- with, when [which it moved between these wireless systems, and continued the communication link] are applied, and carrying out for being, it has the advantage that it can talk over the telephone, without intercepting. However, since a transmission rate changes with each wireless systems, transmission rate control is needed.

[0011]
[Problem(s) to be Solved by the Invention] A software walkie-talkie can be connected now with a desired wireless system by rewriting the software equipped. If this software walkie-talkie is used, it will become possible technically to change a wireless system, i.e., wireless system hand-over, without intercepting a message.
[0012] And it enables it for this to move between these wireless systems and to continue a communication link, when the unrelated system by which plurality differs is employed in the form which is a service area different, respectively and overlaps a service area in part.
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[0014]
[Means for Solving the Problem] In order to attain the above-mentioned purpose, this invention is constituted as follows. That is, in case a wireless system is changed and it shifts at the time of migration in the service area of a different-species wireless system, without intercepting, make a transmission rate assign and it is made a communication link at the assigned transmission rate carrying out in the walkie-talkie whose communication link was adapted for two or more sorts of wireless systems, and enabled with software so that the difference of the transmission rate required of transmission and reception and the transmission rate which can be assigned by the shifting wireless system may make small.
[0015] In this invention, as a result of assigning the transmission rate of a walkie-talkie so that the difference of the transmission rate required of transmission and reception and the transmission rate which can be assigned by each system may be made small, the software walkie-talkie which can carry out now change control of the transmission rate so that a subscriber can communicate without sense of incongruity at the time of the handover between different wireless systems can be offered.
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handover between different-species wireless systems.

[0021] In this case, it may be made to communicate by increasing the rate of picture compression by lessening the amount of data with the fall of a transmission rate. Moreover, when the 2nd wireless system B is a system which performs a time sharing communication link like for example, a TDD/TDMA system, as shown in drawing 2 , two or more transmitting slots TX and receiving slots RX are assigned, and it may be made to make the maximum transmission rate high by this.

[0022] In addition, it is the slot to which the slash section was assigned among drawing 2 , and this example assigns two, TSr1 and TSr2, at a time as TSt1, TSt2, and an object for reception as an object for transmission.

[0023] Conversely, while transmitting the image, when it moves to the 1st wireless system A from the 2nd wireless system B, it controls similarly.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] Drawing in which being drawing for explaining this invention and showing an example of the service area where two or more different-species wireless systems are intermingled.
[Drawing 2] Drawing which is drawing for explaining this invention and explains the example corresponding to transmission rate modification in the case of the communication link which uses two or more slots.
[Drawing 3] The flow chart which is drawing for explaining this invention and shows an example of the procedure of the transmission rate control by this invention.
[Drawing 4] Drawing in which being drawing for explaining this invention and showing examples of a display, such as a transmission rate in the walkie-talkie in connection with this invention.
[Drawing 5] Drawing showing the example of the service area where two or more different-species wireless systems are intermingled.
[Description of Notations]
41 -- Body of a software walkie-talkie
42 -- Display
43 -- Average information on a transmission rate
44 -- Classification information on a wireless system current in use.

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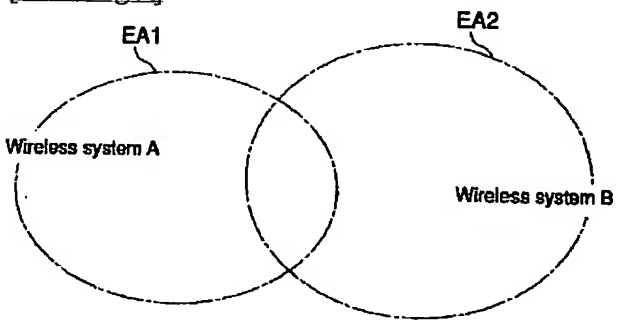
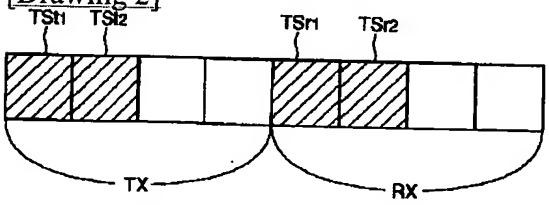
DRAWINGS

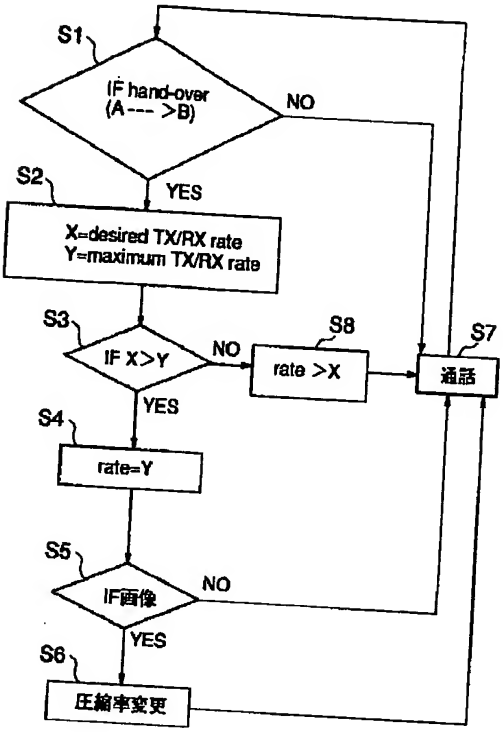
[Drawing 1]



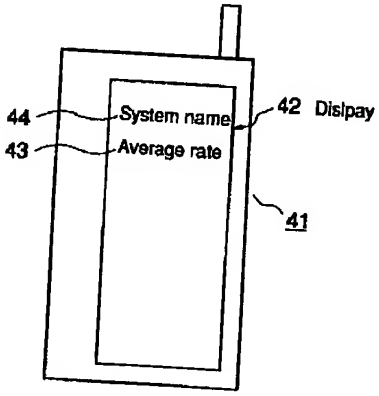
[Drawing 2]



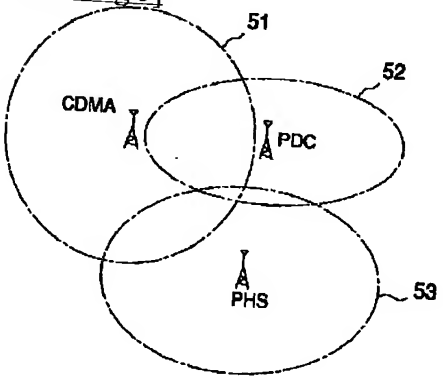
[Drawing 3]



[Drawing 4]



[Drawing 5]



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